OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **POOL POND,** the program coordinators recommend the following actions. *Thank you for including a second sampling event this summer. Both dates occurred with a DES biologist present. Please continue to sample the pond at least twice per summer.*

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *fairly stable* in-lake chlorophyll-a trend. The chlorophyll concentration decreased this season, possibly as a result of the decrease in epilimnetic phosphorus concentration. The mean concentration was well below the state's mean reference line. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a *slightly improving* trend in lake transparency. Mean transparency results were above the New Hampshire mean reference line for the first time. The Secchi disk was even viewed on the pond bottom in July. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is

the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show a *fairly stable*, but *slightly improving* trend for in-lake phosphorus levels. Phosphorus concentrations decreased this season and were below the New Hampshire median once again. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- Due to the high turbidity (Table 11) and phosphorus (Table 8) levels in the Coleman Inlet, we suggest this inlet should be sampled only at times of high water. There was very little flow in the inlet on both sampling dates this summer. Since it is such a small stream we do not feel the monitoring program at Pool Pond will be adversely affected by the elimination of the Coleman Inlet as a sampling station.

- Conductivity levels decreased from last year's values throughout most of the Pool Pond watershed (Table 6). The rain this summer likely helped to flush the waters more readily, thereby removing any pollutants.

- The Mt. Road Inlet has had high total phosphorus concentrations since VLAP began sampling the pond in 1990 (Table 8). We suggest trying to find a section of the inlet that flows most times during the summer. This summer the inlet was stagnant on both sampling dates. Stagnant waters tend to concentrate nutrients and pollutants and the results appear worse than they actually are.

- **Please note** on one occasion this summer the Old Forge Inlet phosphorus level was recorded as less than 5 µg/L. The NHDES Laboratory Services adopted a new method of reporting total phosphorus this year and the lowest value that can be recorded is 'less than 5 µg/L'. We would like to remind the association that a reading of 5 µg/L is considered low for New Hampshire's waters.

- Dissolved oxygen levels were high on both sampling dates this summer (Table 9). Shallow ponds, such as Pool Pond, tend to be mixing continuously by wind and wave action.

- The *E. coli* level at the Old Forge Inlet in July exceeded the state standard for surface waters of 406 counts per 100 mL (Table 12). The inlet was tested above and below the pond at Lily's Restaurant in September, with low results. Unfortunately, biologists did not have a

chance to return to sample the inlet during a fall rainstorm. We do plan on visiting the inlet during a spring rainstorm or snowmelt to test for the bacterium again. It is possible the high counts correlate with the numerous ducks present in the pond at Lily's Restaurant.

NOTES

- Monitor's Note (7/6/00): Mt. Road Inlet pretty stagnant, sample taken anyway for duplicates. Iron bacteria present in Mt. Road Inlet.

- Biologist's Note (7/6/00): Weed identified as Mermaid Weed.

USEFUL RESOURCES

Anthropogenic Phosphorus and New Hampshire Waterbodies, NHDES-WSPCD-95-6, NHDES Booklet, (603) 271-3503

What is a Watershed?, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Road Salt and Water Quality, WD-WSQB-7, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

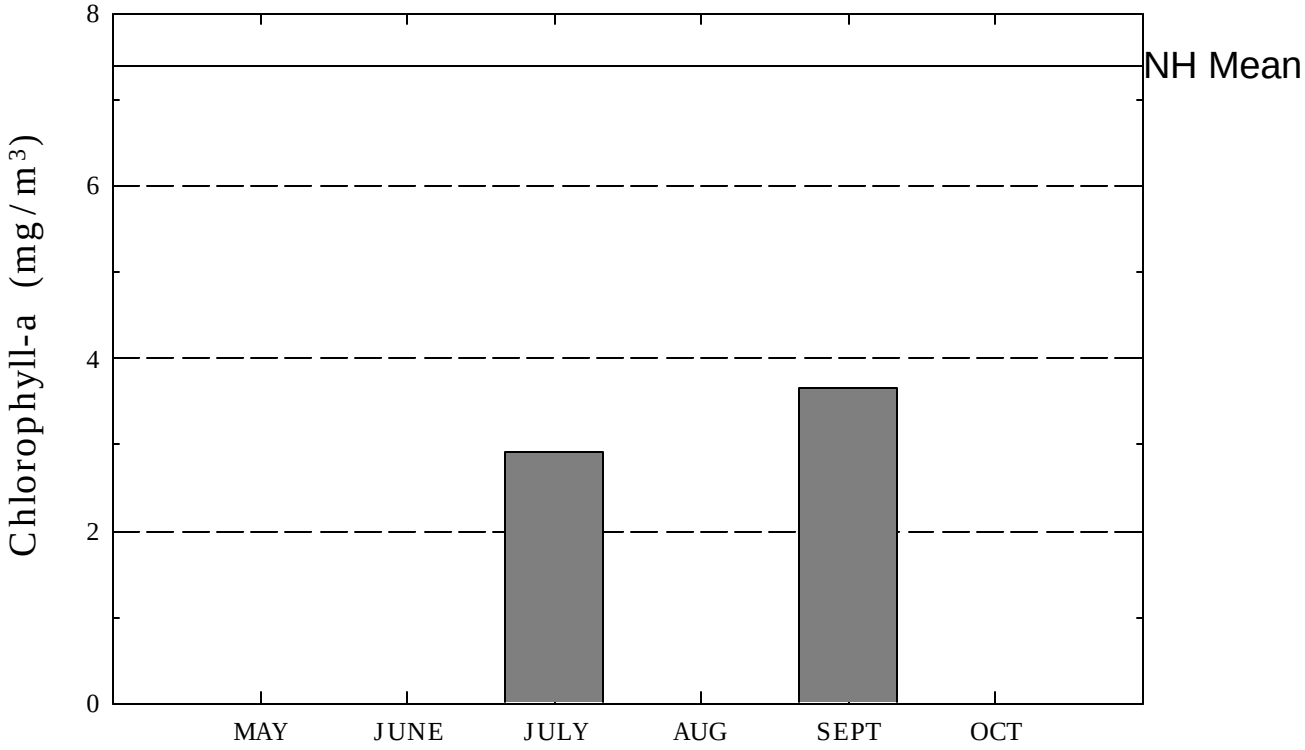
Through the Looking Glass: A Field Guide to Aquatic Plants. North American Lake Management Society, 1988. (608) 233-2836 or www.nalms.org

A Boater's Guide to Cleaner Water, NHDES pamphlet, (603) 271-3503 or www.state.nh.us

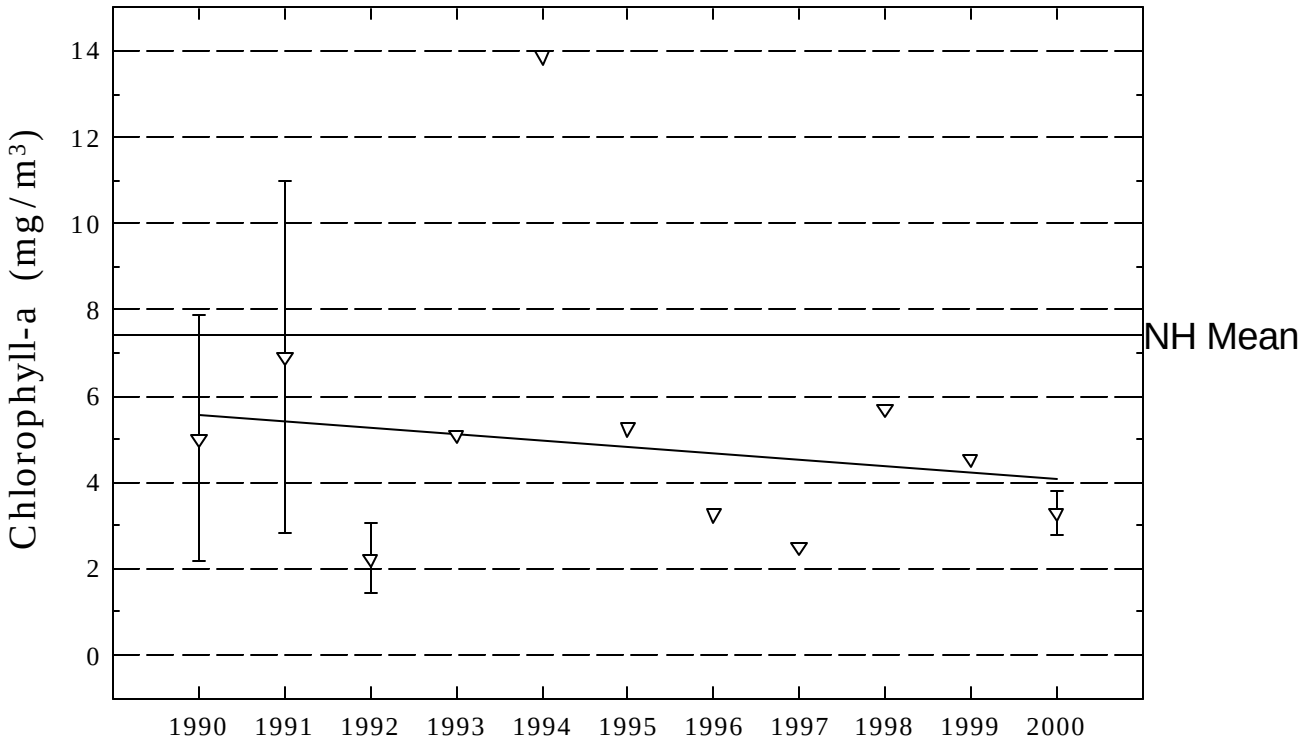
Answers to Common Lake Questions, NHDES-WSPCD-92-12, NHDES Booklet, (603) 271-3503.

Pool Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



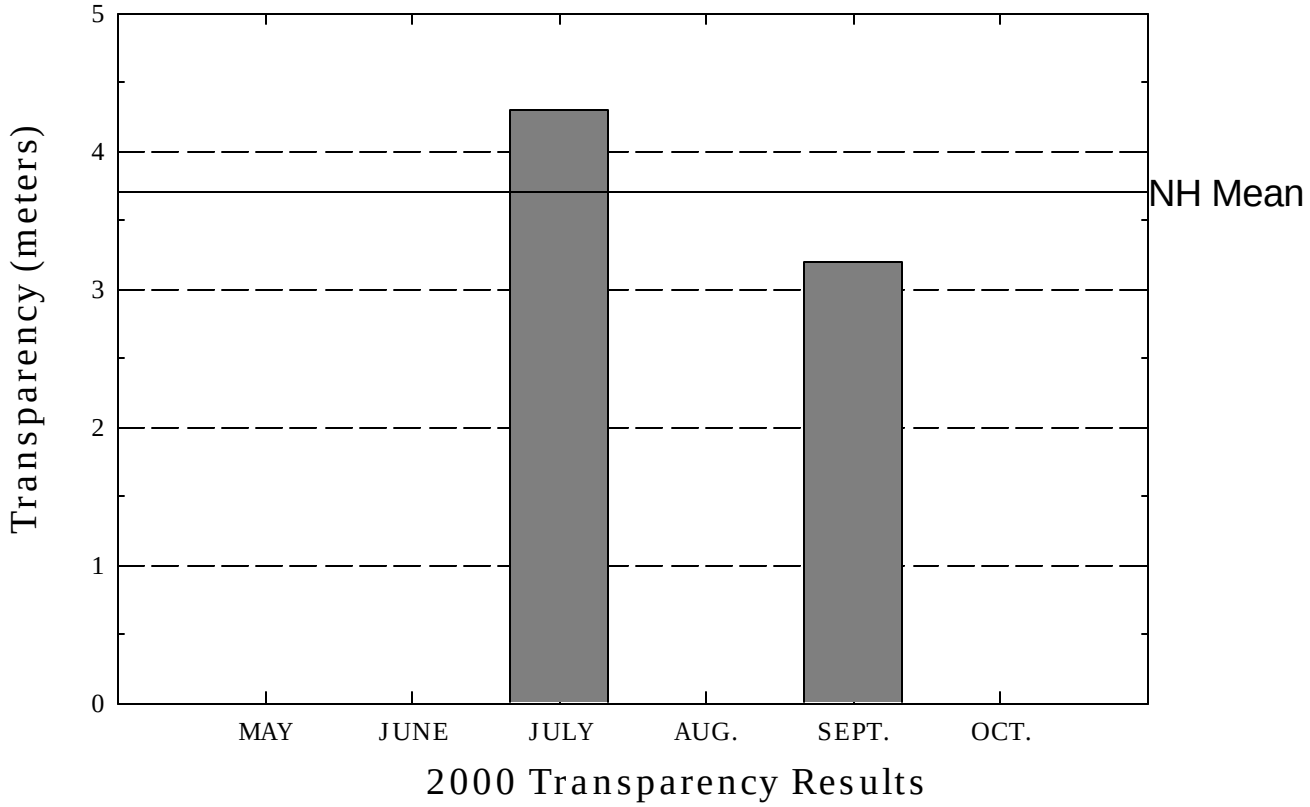
2000 Chlorophyll-a Results

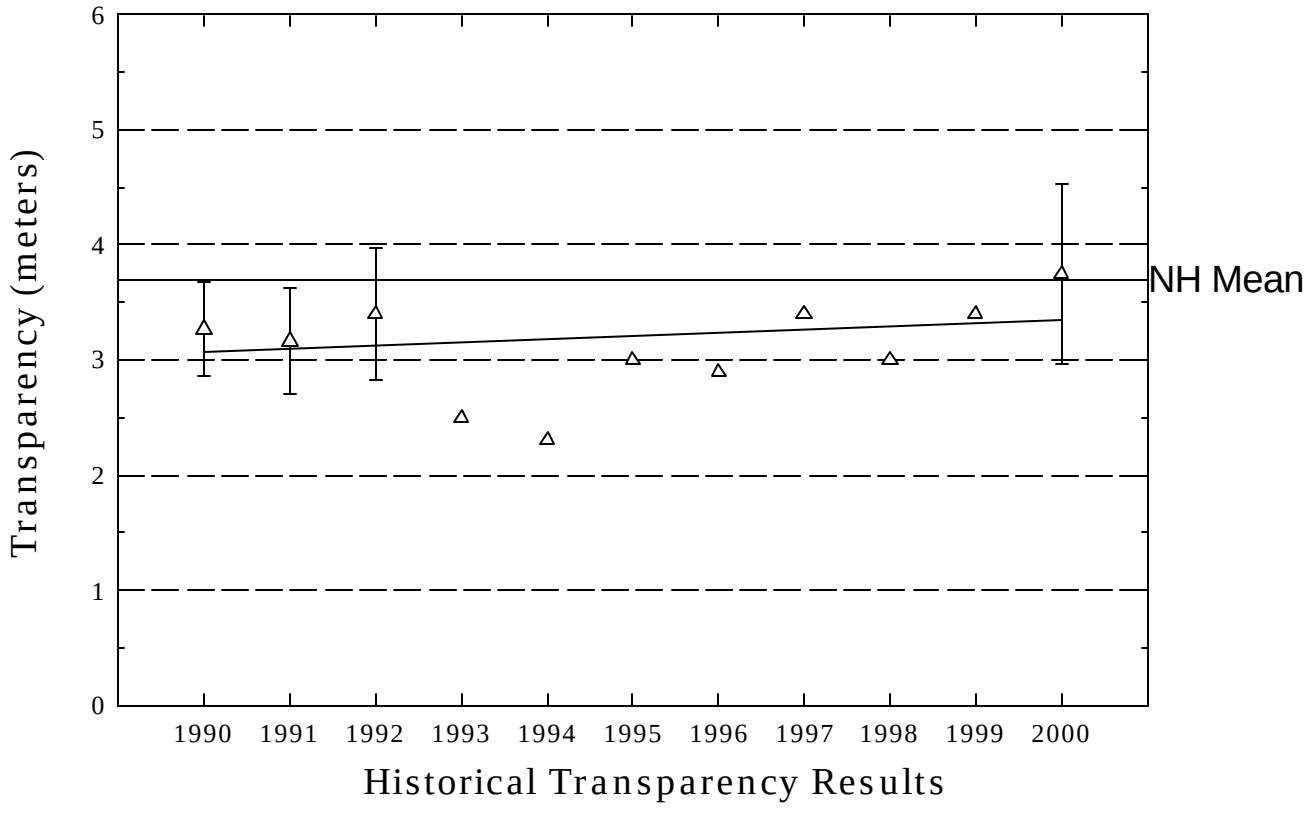


Historical Chlorophyll-a Results

Pool Pond

Figure 2. Monthly and Historical Transparency Results





Pool Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

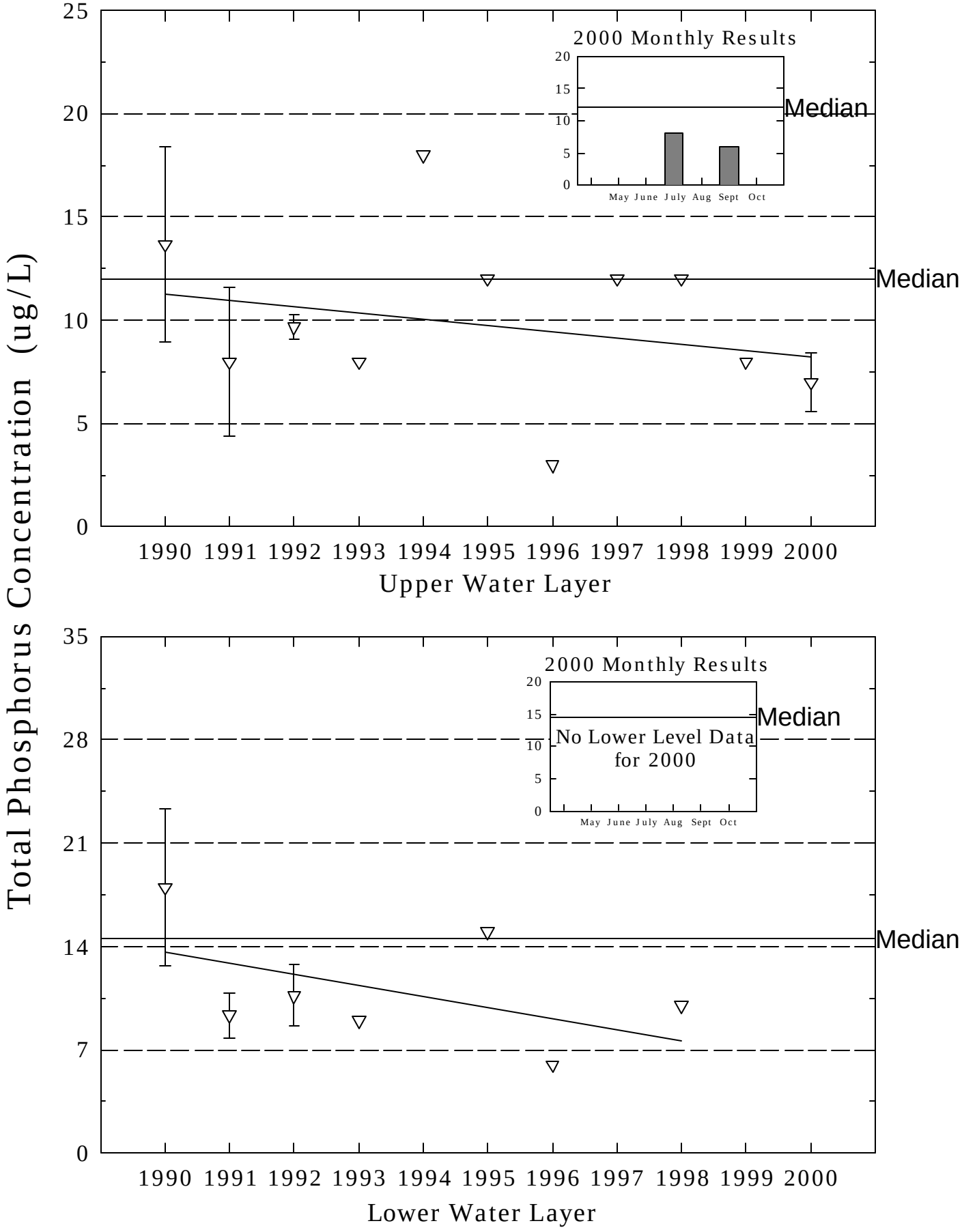


Table 1.

POOL POND

RINDGE

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1990	2.37	8.03	5.02
1991	4.24	11.59	6.91
1992	1.47	3.08	2.23
1993	5.10	5.10	5.10
1994	13.89	13.89	13.89
1995	5.26	5.26	5.26
1996	3.27	3.27	3.27
1997	2.51	2.51	2.51
1998	5.69	5.69	5.69
1999	4.55	4.55	4.55
2000	2.92	3.65	3.28

Table 2.

POOL POND

RINDGE

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
06/08/1990	DINOBRYON	87
06/21/1991	CHRYSOSPHAERELLA	37
	DINOBRYON	56
06/09/1992	SPHAEROCYSTIS	31
	CERATIUM	28
	ANABAENA	16
07/13/1992	DINOBRYON	36
	CERATIUM	21
	ANABAENA	11
09/24/1992	CHRYSOSPHAERELLA	90
07/21/1993	PERIDINIUM	24
	ARANOCAPSA	14
08/08/1994	MICROCYSTIS	41
	DINOBRYON	41
06/01/1995	UNKNOWN	87
	DINOBRYON	5
	COELOSPHAERIUM	3
07/18/1996	DINOBRYON	68
	ASTERIONELLA	16
	ANABAENA	12
07/31/1997	DINOBRYON	61
	CHRYSOSPHAERELLA	17
	SYNURA	14
08/21/1998	COELESPHAERIUM	46
	PERIDINIUM	16
	CHRYSOSPHAERELLA	11

Table 2.

POOL POND

RINDGE

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
08/31/1999	DINOBRYON	44
	PERIDINIUM	31
	MICROCYSTIS	7
07/06/2000	DINOBRYON	58
	UROGLENOPSIS	14
	STAURASTRUM	7
09/08/2000	CHRYSOSPHAERELLA	80
	DINOBRYON	16
	COELOSPHAERIUM	2

Table 3.

POOL POND

RINDGE

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1990	2.9	3.7	3.2
1991	2.9	3.7	3.1
1992	3.0	3.8	3.4
1993	2.5	2.5	2.5
1994	2.3	2.3	2.3
1995	3.0	3.0	3.0
1996	2.9	2.9	2.9
1997	3.4	3.4	3.4
1998	3.0	3.0	3.0
1999	3.4	3.4	3.4
2000	3.2	4.3	3.7

Table 4.

POOL POND

RINDGE

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
COLEMAN INLET				
	1997	6.32	6.32	6.32
	1998	6.33	6.33	6.33
	2000	6.40	6.44	6.42
EPILIMNION				
	1990	6.25	6.69	6.46
	1991	6.15	6.71	6.43
	1992	6.47	6.87	6.60
	1993	6.86	6.86	6.86
	1994	6.66	6.66	6.66
	1995	6.48	6.48	6.48
	1996	6.17	6.17	6.17
	1997	6.46	6.46	6.46
	1998	6.50	6.50	6.50
	1999	6.13	6.13	6.13
	2000	6.41	6.60	6.49
FIRE POND				
	1996	4.37	4.37	4.37
HYPOLIMNION				
	1990	6.29	6.56	6.43
	1991	6.35	6.68	6.52
	1992	6.49	6.71	6.61
	1993	6.48	6.48	6.48
	1995	6.45	6.45	6.45
	1996	6.12	6.12	6.12

Table 4.

POOL POND

RINDGE

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
	1998	6.44	6.44	6.44
MT. ROAD INLET				
	1990	5.24	5.86	5.43
	1991	5.46	5.72	5.58
	1992	5.65	5.67	5.66
	1994	5.61	5.61	5.61
	1995	5.55	5.55	5.55
	1997	5.67	5.67	5.67
	2000	5.23	5.52	5.35
OLD FORGE INLET				
	1990	6.26	6.45	6.36
	1991	5.94	6.57	6.22
	1992	6.35	6.40	6.37
	1993	6.02	6.02	6.02
	1994	6.50	6.50	6.50
	1995	6.36	6.36	6.36
	1996	6.21	6.21	6.21
	1997	6.47	6.47	6.47
	1998	6.58	6.58	6.58
	1999	6.36	6.36	6.36
	2000	6.43	6.46	6.44
OUTLET				
	1990	6.31	6.58	6.46
	1991	6.24	6.53	6.36
	1992	6.59	6.63	6.61
	1994	6.67	6.67	6.67

Table 4.

POOL POND

RINDGE

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
	1995	6.08	6.08	6.08
	1996	6.12	6.12	6.12
	1997	6.46	6.46	6.46
	1999	6.24	6.24	6.24
	2000	6.32	6.49	6.40

Table 5.

POOL POND

RINDGE

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1990	2.40	3.90	3.33
1991	3.50	4.30	3.90
1992	2.70	4.90	3.93
1993	4.70	4.70	4.70
1994	4.80	4.80	4.80
1995	2.60	2.60	2.60
1996	2.60	2.60	2.60
1997	4.80	4.80	4.80
1998	4.60	4.60	4.60
1999	2.80	2.80	2.80
2000	2.90	3.60	3.25

Table 6.

POOL POND
RINDGE

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
COLEMAN INLET				
	1997	143.6	143.6	143.6
	1998	175.7	175.7	175.7
	2000	178.1	195.1	186.6
EPILIMNION				
	1990	124.3	131.0	126.5
	1991	107.9	124.2	117.5
	1992	129.7	136.4	133.0
	1993	156.0	156.0	156.0
	1994	161.7	162.7	162.2
	1995	141.2	141.2	141.2
	1996	143.2	143.2	143.2
	1997	153.6	153.6	153.6
	1998	142.9	142.9	142.9
	1999	187.7	187.7	187.7
	2000	166.2	171.5	168.8
FIRE POND				
	1996	120.0	120.0	120.0
HYPOLIMNION				
	1990	122.3	131.2	127.5
	1991	105.7	123.9	116.7
	1992	130.3	138.2	134.2
	1993	156.2	156.2	156.2
	1995	141.1	141.1	141.1
	1996	144.8	144.8	144.8
	1998	145.6	145.6	145.6

Table 6.

POOL POND

RINDGE

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
MT. ROAD INLET				
	1990	160.8	270.6	199.3
	1991	113.3	295.0	185.4
	1992	130.9	216.2	173.5
	1994	301.0	301.0	301.0
	1995	201.0	201.0	201.0
	1997	427.0	427.0	427.0
	2000	277.0	294.0	285.5
OLD FORGE INLET				
	1990	135.0	211.8	162.9
	1991	113.7	209.0	163.5
	1992	121.3	227.8	174.5
	1993	485.5	485.5	485.5
	1994	203.0	203.0	203.0
	1995	166.9	166.9	166.9
	1996	146.0	146.0	146.0
	1997	191.3	191.3	191.3
	1998	230.0	230.0	230.0
	1999	245.8	245.8	245.8
	2000	173.1	194.7	183.9
OUTLET				
	1990	127.4	132.9	129.3
	1991	106.4	120.6	113.5
	1992	129.5	134.4	131.9
	1994	161.7	161.7	161.7
	1995	141.7	141.7	141.7

Table 6.

POOL POND

RINDGE

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
	1996	144.2	144.2	144.2
	1997	152.4	152.4	152.4
	1999	188.3	188.3	188.3
	2000	165.6	171.7	168.6

Table 8.

POOL POND

RINDGE

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
COLEMAN INLET				
	1997	9	9	9
	1998	8	8	8
	2000	38	53	45
EPILIMNION				
	1990	10	19	13
	1991	5	12	8
	1992	9	10	9
	1993	8	8	8
	1994	15	18	16
	1995	12	12	12
	1996	3	3	3
	1997	12	12	12
	1998	12	12	12
	1999	8	8	8
	2000	6	8	7
FIRE POND				
	1996	11	11	11
HYPOLIMNION				
	1990	14	24	18
	1991	8	11	9
	1992	9	13	10
	1993	9	9	9
	1995	15	15	15
	1996	6	6	6
	1998	10	10	10

Table 8.

POOL POND

RINDGE

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
MT. ROAD INLET				
	1990	13	86	43
	1991	13	34	24
	1992	17	28	22
	1994	60	60	60
	1995	16	16	16
	1997	27	27	27
	2000	19	44	31
OLD FORGE INLET				
	1990	6	33	21
	1991	12	21	17
	1992	25	27	26
	1993	10	10	10
	1994	23	23	23
	1995	16	16	16
	1996	15	15	15
	1997	26	26	26
	1998	18	18	18
	1999	19	19	19
	2000	< 5	24	14
OUTLET				
	1990	9	20	13
	1991	6	10	8
	1992	8	9	8
	1994	18	18	18
	1995	13	13	13

Table 8.

POOL POND

RINDGE

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
	1996	12	12	12
	1997	31	31	31
	1999	1	1	1
	2000	6	7	6

Table 9.

POOL POND

RINDGE

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
		July 6, 2000	
0.1	24.5	7.2	86.2
1.0	24.4	7.2	85.9
2.0	24.2	7.1	84.4
3.0	24.1	6.9	82.5
3.5	24.1	6.5	77.2
		September 8, 2000	
0.1	20.6	6.3	70.5
1.0	20.5	6.3	70.4
2.0	20.5	6.3	70.0
3.0	20.3	6.2	68.8

Table 10.

POOL POND

RINDGE

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
June 8, 1990	4.5	19.0	8.2	88.9
June 21, 1991	3.5	20.8	6.4	71.9
June 9, 1992	4.0	17.8	9.1	96.1
July 13, 1992	4.0	23.0	7.7	89.0
September 24, 1992	3.5	18.0	8.5	90.2
July 21, 1993	3.5	22.5	6.9	78.0
August 8, 1994	3.5	22.3	6.4	73.0
June 1, 1995	3.7	18.5	9.2	97.0
July 18, 1996	4.0	22.7	4.7	53.0
July 31, 1997	3.5	22.2	6.2	71.0
August 21, 1998	3.5	21.7	2.3	26.0
August 31, 1999	3.5	21.5	7.4	83.9
July 6, 2000	3.5	24.1	6.5	77.2
September 8, 2000	3.0	20.3	6.2	68.8

Table 11.

POOL POND
RINDGE

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
COLEMAN INLET				
	1997	0.7	0.7	0.7
	1998	2.4	2.4	2.4
	2000	2.3	10.8	6.5
EPILIMNION				
	1997	0.7	0.7	0.7
	1998	1.3	1.3	1.3
	1999	0.7	0.7	0.7
	2000	0.3	0.5	0.4
HYPOLIMNION				
	1998	1.5	1.5	1.5
MT. ROAD INLET				
	1997	9.5	9.5	9.5
	2000	2.7	4.2	3.4
OLD FORGE INLET				
	1997	1.7	1.7	1.7
	1998	3.2	3.2	3.2
	1999	3.6	3.6	3.6
	2000	0.5	2.5	1.5
OUTLET				
	1997	0.5	0.5	0.5
	1999	0.6	0.6	0.6
	2000	0.4	0.4	0.4

Table 12.

POOL POND

RINDGE

Summary of current year bacteria sampling.
Results in counts per 100ml.

Location	Date	E. Coli See Note Below
COLEMAN COVE		
	September 18	0
ELMER HANSON		
	September 8	1
FOURNIER		
	July 6	1
	September 8	0
OLD FORGE INLET		
	July 6	660
	August 7	5
PINE EDEN BEACH		
	July 6	1
	September 8	0
STREAM ABOVE LILY'S POND		
	August 7	16
	September 8	6
STREAM BELOW LILY'S POND		
	August 7	238
	September 8	51
WALSH		
	July 6	0
	September 8	0

NOTE: "<" means "less than" and ">" means "greater than"